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1 **19. LAND PRESERVATION AND BUY-BACK (NAME WILL BE CHANGED TO LAND SET ASIDE FOR STREAM AND HABITAT RESTORATION - [Low]**

Land set aside can be employed to preserve, protect, connect, and / or restore floodplains and their associated habitats. This technique provides protection to high quality habitat or allows for the recovery or restoration of altered portions of a watershed. This technique when used in conjunction with other techniques can provide valuable connectivity between habitats within a watershed and have significant effects on the physical and biological functions of a stream and adjacent riparian, wetland, and upland habitats.

This technique should be considered when implementing any stream restoration work in order to maximize floodplain function, condition, and connectivity and may be necessary in order to achieve success on some types of restoration projects. For example, conservation easements are often applied to lands where a considerable amount of funding (especially public) has been spent to restore a site in order to guarantee compatible land use activities that protect the investment.

1.1 Introduction

1.1.1 Description of Technique

Land preservation

Land preservation protects and maintains *existing* high quality habitat. It is a technique that is generally permanent or at least provides for long-term protection of resources. Preservation involves preventing deleterious alterations to the land as well as managing the aquatic ecosystem to maintain its natural functions and characteristics (National Research Council 1992). Land preservation may be implemented for whole or portions of watersheds or floodplains. Protecting whole watersheds provides refugia habitat for species at risk, protects biodiversity hotspots, and offers a chance for broad scale conservation (WADNR 2000). Protecting critical upland areas of watersheds may reduce sediment sources, provide buffering to riparian areas,

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improve water quality, reduce runoff, and provide wildlife corridors that link habitats. Since intact floodplains are rare, their preservation may be key for both protection of resources and for use as reference sites, which are needed to establish conditions for restoration activities in similar areas.

Zoning

Zoning can protect streams, floodplains, and resources within a watershed by; restricting land use in critical areas, requiring buffers adjacent to critical areas, preserving open space, creating wildlife corridors, protecting riparian and wetland areas, altering development patterns, and reducing impervious surfaces. Zoning combined with other restoration strategies can have a significant cumulative effect at a watershed and landscape scale. Various zoning tools include: (Protecting Wetlands, Chesapeake Bay Program 1997); cluster zoning, planned unit development, low impact development, performance based zoning, overlay zones, transferable development rights, bonus / incentive zoning, large lot zoning, agricultural protection zoning, and urban growth boundaries.

Buy-back

Buy-back is a method to reclaim floodplain property that is frequently damaged by floods. This may allow restoration to occur on the property by the complete or partial removal or breaching of dikes and levees, removal of bank protection structures, removal of floodplain fill and tile drains, restoration or reconnection of side channels and wetland areas, and revegetation of the floodplain.

Acquisition and Easements

Land acquisitions or easements can be used to protect and restore floodplains and their adjacent habitats. This technique used in conjunction with other restoration techniques can be applied on floodplains that have been cleared, leveled, filled, and levied in order to achieve stream system function. Acquisition is often used in combination with an easement. Easements can also be used independently allowing a landowner to hold title to the property, but have some land use restrictions that are compatible with restoration objectives. Easements may be permanent, long-term (e.g., 30 years), or short-term (e.g., 5 to 15 years), sometimes easements may be combined with rental payments. Acquisitions or easements allow for the restoration and protection of floodplains to restore stream function, which in turn provides a variety of critical aquatic, wetland, and riparian habitats. This method can also provide opportunities to provide a buffer between a stream and potentially deleterious land uses within the watershed.

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1.1.2 Physical and Biological Effects

Physical (geomorphic) and ecological benefits of providing space for rivers and their floodplains are numerous. Benefits that may be realized if the preserved land is located within the channel migration zone, floodplain, or riparian zone include:

- Preserves, or provides the opportunity to restore, the connection of streams with their floodplains. The duration and frequency of floodplain inundation effects riparian plant species and distribution, floodplain sediment deposition, hyporheic flows, groundwater infiltration, redox potential, nutrient cycling, recruitment/deposition of wood, the supply of water to adjacent wetlands and ponds, and access of fish and wildlife to various floodplain habitats. It can also alter the timing, depth, magnitude, and velocity of high stream flows.
- Preserves/provides the opportunity for channel migration, at least within the confines of the protected lands. This, in turn, provides the opportunity to create and maintain diverse stream and riparian habitat through gravel and wood recruitment and side channel development.
- Provides the opportunity to restore natural planform, profile, and cross-section to channelized streams.
- Preserves/provides a buffer between the stream and adjacent land uses which can moderate cumulative watershed effects.
- Preserves/provides the opportunity to restore a native plant riparian zone. Effects of this may include:
 - Moderation of stream temperatures in the summer and winter from improved riparian/wetland habitats, hyporheic flows, and groundwater infiltration.
 - Improvement in water quality by filtering sediment, nutrients and contaminants from surface runoff and groundwater before it reaches the stream.
 - Improved streambank stability.
 - Preservation/creation of fish and wildlife habitat: food, water, cover.

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- Re-establishment of critical and productive habitats such as, wetland, riparian, backwater and side-channel habitats.
- Improvement in ground water storage capacity (increase summer flows).
- Increased plant diversity and biomass production.
- Moderate fluctuations in the temperature of the stream and other aquatic habitats within the vegetated riparian zone. Shade provided by a riparian canopy can keep the water relatively cool in the summer and may prevent it from freezing in the winter.

Benefits that may be realized if preserved land is located anywhere in the watershed include:

- Preserves, or provides opportunity for the recovery of, high quality fish and wildlife habitat.
- Preserves/provides the opportunity to restore the connection between aquatic and terrestrial habitats (e.g., provides wildlife corridors and access to side channels, ponds, and wetlands). This connection is often lost during land development.
- Reduces the potential for the delivery of excessive levels of sediment to the stream through preservation or restoration of watershed stability.
- Reduces the potential for the delivery of contaminants to the stream.
- Reduces the potential for the delivery of excessive levels of surface runoff to the stream by reducing the amount of impervious surface in the watershed.

1.1.3 Application of Technique

Land set aside techniques can be applied in any area that will ultimately protect a stream's physical or biological functions. This may include not only habitat adjacent to a stream, but also any upland habitat that is a critical area to stream function. The most cost effective applications of this technique are to watersheds and land that require no or minimal restoration. Some examples of where land set aside may be appropriate include:

- Priority sites such as habitats "at risk"
- Frequently flooded areas
- Where limited development has left some opportunity for managing river as a corridor
- Areas immediately adjacent to the stream, within the stream channel migration zone, floodplain, or riparian zone

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- Areas of the watershed that are highly susceptible to mass wasting
- Areas that provide, or provide access to, unique or critical habitat to fish and wildlife
- Pristine watersheds or those where limited development has left some opportunity for managing the river as a corridor, rather than from property line to property line.
- Non-incised alluvial channels which allow streams to meander and access their floodplain
- Intact properties or those where natural recovery is likely once the existing land use is abolished
- Restoration project sites and land adjacent to restoration project sites, especially those where a considerable amount of funding has been spent, to guarantee compatible land use activities that protect the investment.
- Streams that provide critical habitat to species in decline including
- Watersheds with relatively natural hydrology

Buy-back

Buy-back is applied to floodplain areas where existing development suffers from repeated damage and will help to prevent a recurring threat to people and property and will help to restore natural processes in the floodplain, and promote open spaces.

1.2 Scale

This approach is best applied at a reach scale, but more benefits will be accrued when applied at a watershed and landscape scale. Opportunities may arise at a local level that will help to initiate larger landscape level efforts. Benefits increase substantially as the extent and connectedness of protected lands increases. Cumulatively this technique can have a significant effect on watershed hydrology, habitat, and stream function. In some situations it may be critical to have land set aside on multiple properties in order to move forward on a restoration project or gain needed results. As an example, the removal of a levee to provide channel migration opportunities may require set aside of the property where the levee sits, as well as adjacent property the levee protects.

1.3 Risk and Uncertainty

Land set aside can greatly reduce potential damage to property, lives, and infrastructure. It also greatly increases the potential success of other restoration efforts at a local and landscape level.

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Instream habitat may still be at risk of degradation if watershed conditions still deliver excessive amounts of sediment or water into the system. This may result in incised channels, increased bank erosion, embedded spawning areas, and loss of channel complexity.

Variables such as invasive species, alterations to watershed hydrology, or significant land use changes may reduce projected habitat values and functions.

1.4 Data Collection and Assessment

Data collection (note, this section will be expanded):

Need to start with discussion of watershed assessment.

- Property ownership
- Topography
- Historic and existing channel pattern

Flood prone areas can be delineated using evidence gleaned from aerial photographs, FEMA maps, local records, hydrologic models or from channel and valley bottom characteristics.

- Habitat info needed for refugia study?
- Priority habitat species maps?

1.5 Methods

Land set aside can be accomplished through land acquisition, land donation, conservation easements, or zoning. For the goal of stream habitat preservation and restoration, land should be prioritized for preservation based on its importance to maintaining stream and floodplain processes and biodiversity. This concept when applied, aims at representing of a variety of native ecosystems types and stages that are able to maintain viable species population and protect physical and biological processes. (Saving Natures Legacy, Noss & Cooperrider 1994)

To maximize the various benefits of land preservation and protection, a strategy that works towards de-fragmentation of the landscape is advised. The principles to be applied are to enlarge and unify habitat patches, enlarge and connect corridors and patches, protect and connect existing high quality habitat, and provide structurally diverse corridors and patches (Conservation Corridor Planning at the Landscape Level , NRCS 1999). Frissell (will get reference) recommends identifying hot spots in order to develop a reserve network. This is done by identifying good habitat areas (refuge), adjunct areas next to refuge habitat, nodal areas which are vital to a particular species life history, source areas that support stable resource or habitat conditions, and degraded low value habitat. These areas can then be prioritized for preservation on a landscape level plan. In general, areas identified for land set

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aside -should be:

1. As large as possible
2. Close together
3. Round in shape rather than linear
4. Connected

(Conservation Corridor Planning at the Landscape Level , NRCS 1999).

Areas of protection within and along floodplains can be delineated using FEMA 100 year floodway maps, recent high flow maps, landscape features, soil surveys, meander belt width, and aerial photos.

Buy back opportunities usually occur after a flood event where various funds, such as those from the Federal Emergency Management Agency (FEMA) or the Natural Resource Conservation Service (NRCS) Emergency Watershed Protection (EWP) program, become available. Funds can be then combined for one time buyout of high flood risk properties. Once this occurs, natural floodplain recovery/restoration can take place. Floodplain restoration may include removal of structures, floodplain fill, and bank protection or removal or modification of existing levees that are no longer necessary to protect the land. This also may involve assisting landowners to move outside of floodplain.

FEMA can acquire certain floodprone sites if it meets specific requirements including that the site must be substantially damaged or have suffered repeated damage and local government must be willing to take responsibility for continued maintenance (FEMA Design Guidelines).

1.6 Project Implementation

1.6.1 Permitting

In general no permitting is required. Other on-the-ground restoration activities that will restore the site may require permits. See individual techniques for these requirements.

1.6.2 Construction

Fences or alterations to access may need to be constructed in order to protect the property form various land use activities.

1.6.3 Cost Estimation

Cost is limited to property acquisition and property management. Costs may be offset in the long-term if preservation and protection efforts successfully reduce; excessive fine sediment and water delivery to

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the stream, flood damage, channel instability, etc.

1.6.4 Monitoring and Tracking

The type of monitoring will depend on the objective (anticipated gain) from land set aside. Monitoring will need to be tied to project specific objectives such as; increased habitat and connectivity of habitat, benefits to a specific species, provide the opportunity for channel migration, reduce the delivery of excessive amounts of fine sediment and water to the stream, reduce flood damage, etc.

- Field mapping of extent of various flood events.
- Monitoring lateral migration of stream channel and evaluation of risk to infrastructure/property when it migrates.
-

1.6.5 Contracting Considerations

Not applicable

1.7 Operations and Maintenance

Property management.

1.8 Examples

Examples will be providedUse Inter-Fluve's Nooksack River Meander Corridor Delineation Study for this.

Also use similar study done for the lower Walla Walla, and City of Sumner Shoreline resource Inventory Floodproofing in the Skokomish Valley – Doug contact Dan Sokol, Ecology
Several TNC properties in WA including whole watersheds.

1.9 References

National Research Council. 1992. Restoration of Aquatic Ecosystems: Science, Technology, and Public Policy. National Academy Press, Washington, D.C. pp.552.

Washington Department of Ecology. 1996(rev.2000). Exploring Wetlands Stewardship: A Reference Guide for Washington Landowners. Washington Dept. of Ecology pub. #96-120

Reference for buy-back and floodproofing: Design Guidelines for Flood Damage Reduction, FEMA 1981 and Emergency Watershed Protection Program managed by NRCS (will get more info on this later) .

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1.10 Photo and Drawing File Names

List filenames and file locations of any photos and drawing files associated with this technique